

IN THE CLAIMS:

1 - 21. (CANCELLED).

22. (CURRENTLY AMENDED) The apparatus of claim [21] 38 wherein the processor is [configured and] adapted to determine the pressure characteristic [for the conduit] as a function of the [flow signal] input air flow with empirically determined constants.

23. (ORIGINAL) The apparatus of claim 22 wherein the processor is configured and adapted to determine the pressure characteristic by calculating the pressure characteristic as a function of a sign of the measure of airflow and a sign of a squared measure of airflow.

24. (CURRENTLY AMENDED) A method for determining a delivery pressure at a mask during pressure assistance of a patient from remote measurements of pressure comprising:

providing a controllable pressure delivery device with a mask and conduit;

delivering pressure treatment to a patient through the conduit to the mask with the pressure delivery device;

measuring a pressure distally from the mask;

continuously determining a pressure characteristic for the conduit;

calculating an [estimated] instantaneous mask pressure as a function of the measured distal pressure and the determined pressure characteristic;

calculating a conductance associated with a leak from said mask as a function of the average values of said instantaneous mask pressure and air flow to the mask taken over a time period that exceeds a normal breath;

calculating an instantaneous leak flow based on said instantaneous mask pressure and said conductance;

selecting a desired mask pressure for setting a delivery pressure for the patient;

controlling the pressure delivery device to deliver the desired mask pressure as a function of the estimated mask pressure and the instantaneous leak airflow.

25. (ORIGINAL) The method of claim 24 further comprising the step of measuring airflow in the conduit, and wherein the step of determining the pressure characteristic for the conduit includes the sub-step of calculating the pressure characteristic as a function of the measured airflow.

26. (CURRENTLY AMENDED) The method of claim 25 wherein the step of calculating an estimated mask pressure includes the sub-step of subtracting the pressure characteristic from the measured distal pressure.

27. (ORIGINAL) The method of claim 26 further comprising the step of determining empirical constants for the conduit, and wherein the step of determining the

pressure characteristic calculates the pressure characteristic as a further function of the empirical constants.

28. (ORIGINAL) The method of claim 27 wherein the pressure characteristic of the conduit is calculated as a function of a sign of the measure of airflow and a sign of a squared measure of airflow.

29. (CURRENTLY AMENDED) A method for determining [a pressure] a mask airflow at a mask during pressure assistance of a patient from remote measurements of pressure comprising:

providing an airway pressure treatment apparatus with a mask and conduit;

delivering airway pressure treatment to a patient through the conduit to the mask with the apparatus;

measuring a pressure distally from the mask;

continuously determining a pressure drop to the mask for the conduit; [and]

determining a conductance of a leak from the mask;

determining an instantaneous leak airflow from said conductance

[adjusting the measured distal pressure] calculating the air flow at the mask as a function of the determined pressure drop [to calculate the pressure at the mask] and the instantaneous leak airflow.

30. (ORIGINAL) The method of claim 29 further comprising the step of measuring airflow in the conduit, and wherein the step of determining the pressure drop for the conduit includes the sub-step of calculating the pressure drop as a function of the measured airflow.

31. (ORIGINAL) The method of claim 30 wherein the step of adjusting the measured distal pressure includes the step of subtracting the pressure drop.

32. (ORIGINAL) The method of claim 31 further comprising the step of determining empirical constants for the conduit, and wherein the step of determining the pressure drop includes calculating the pressure drop as a further function of the empirical constants.

33. (CURRENTLY AMENDED) The method of claim 32 wherein the pressure drop of the conduit is calculated as a function of a sign of the [measure of] measured airflow [and a sign of a squared measure of airflow],

34. (ORIGINAL) The method of claim 29 further comprising calculating the pressure at the mask and [the step of] controlling the airway pressure treatment as a function of the calculated pressure at the mask.

35. (NEW) The method of claim 24 wherein said leak airflow is determined from said estimated mask pressure.

36. (NEW) An apparatus for determining respiratory airflow during pressure assistance of a patient from remote measurements of pressure comprising:

a mask through which a gas is provided to the patient, and through which some gas leaks out at a leak airflow dependent on the current respiratory phase;

a conduit with a proximate end and a distal end, wherein the proximate end is coupled to the mask;

a gas delivery device coupled to the distal portion of the conduit and providing a gas at a pressure above atmospheric to the airway of the patient through the mask and conduit;

a sensor disposed at said distal end to determine the input air flow from said gas delivery device into said conduit; and

a controller with a processor adapted to:

determine a leak conductance at the mask and the corresponding instantaneous leak air flow; and

calculate the mask airflow to the patient based on said input airflow and said leak airflow.

37 (NEW). The apparatus of claim 36 wherein said sensor determines an input pressure at said distal end of said conduit and said processor is adapted to determine the mask pressure based on said input pressure, and to determine said leak airflow from said mask pressure and said leak conductance.

38 (NEW). The apparatus of claim 37 wherein said processor is adapted to determine a pressure characteristic of said conduit and to determine said mask pressure based on said input pressure and said pressure characteristic.

39. (NEW) The method of claim 29 further comprising determining an exhaust leak airflow and calculating the mask pressure in accordance with the exhaust airflow.

40. (NEW) The method of claim 39 further comprising determining a conduit airflow through the conduit, said mask airflow being related to said conduit airflow and said exhaust airflow.

41. (NEW) The method of claim 40 wherein leak airflow is determined by filtering said mask airflow.

42. (NEW) A computer program for determining instantaneous respiratory airflow from a blower to a mask worn by a subject through a conduit, said conduit having a distal end connected to said blower and a proximal end connected to the mask, the program receiving input data of instantaneous airflow from the blower and the pressure at the blower, comprising the steps of:

determining the pressure drop in the conduit due to the blower airflow;

determining the instantaneous pressure at the mask based on the pressure at the blower and said pressure drop;

determining an instantaneous leak airflow from the mask, said instantaneous leak airflow being related to said instantaneous pressure at the mask; and

determining an airflow from the mask based on blower airflow and the leak airflow.

43. (NEW) The computer program of claim 42 further comprising determining an exhaust airflow and determining the respiratory airflow based on said mask airflow and the leak airflow and the exhaust airflow.

44. (NEW) The computer program of claim 43 wherein said leak airflow is determined by performing low pass filtering a leak conductance from said mask.

45. (NEW) The computer program of claim 42 further comprising selecting a target mask pressure and adjusting the blower airflow to achieve said target airflow pressure.

46. (NEW) An apparatus for determining respiratory air flow during pressure assistance of a patient from remote measurements of pressure comprising:

a mask;

a conduit with a proximate end and a distal end, wherein the proximate end is coupled to the mask;

a gas delivery device coupled to the distal portion of the conduit and providing a gas at a pressure above atmospheric to the airway of the patient through the mask and conduit;

a sensor disposed at said distal end to determine the input air flow from said

- gas delivery device into said conduit; and

processor means processor adapted to:

determine an instantaneous leak airflow based on a leak conductance from said mask; and

calculate the mask airflow to the patient based on said input airflow, and said leak airflow.